CLAIMS:

1. A method for transmitting and receiving a digital message having N digits, each of said N digits having any one of M values, in a system wherein each of said M values k
   - o corresponds with a k^{th}-chaotic signal generator having chaotic characteristic value associating with a chaotic algorithm; and
   - o is transmitted within a bit period

   including the steps of:
   - selecting the corresponding k^{th}-chaotic signal generator;
   - generating a chaotic signal by the corresponding k^{th}-chaotic signal generator; and
   - receiving the chaotic signal at a receiver storing the chaotic characteristic values of all of the chaotic signal generators and a demodulating algorithm, and demodulating the chaotic signal to generate the transmitted value k.

2. The method as claimed in Claim 1, wherein the chaotic signal is demodulated by the demodulating algorithm by the steps of:
   - evaluating the chaotic value of the chaotic signal
   - matching the evaluated chaotic value with the stored chaotic characteristic values; and
   - assigning the transmitted value according to the closest match between the evaluated chaotic value and the stored chaotic characteristic values.

3. A method as claimed in Claim 2, wherein the chaotic signal includes a series of numbers generated by the chaotic algorithm within the bit period.

4. A method as claimed in Claim 3, wherein the chaotic signal is generated by the steps of:
   a) inputting a random number to the chaotic algorithm to generate a first chaotic number;

b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and

c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated.

5. A method as claimed in Claim 4, wherein the evaluated chaotic value and the stored chaotic characteristic values are matched by the steps of:

d) pairing the first two numbers of the chaotic signal received by the receiver to form a first plot on a two-dimensional plane;

e) repeating step d) for all two consecutive numbers subsequently received by the receiver within the bit period to generate a return map;

f) evaluating the chaotic value of the return map; and

g) matching the chaotic value with the stored chaotic values.

6. A method as claimed in Claim 1, wherein M equals to 2, and each digit has a value of either 0 or 1.

7. A method as claimed in Claim 6, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.

8. A method for transmitting the value k in a system for transmitting a digital message having N digits, each of said N digits having any one of M values, and wherein each of said M values k

- corresponds with a k^{th}-chaotic signal generator having chaotic characteristic value associating with a chaotic algorithm; and
- is transmitted within a bit period

including the steps of:

- selecting the corresponding k^{th}-chaotic signal generator; and
- generating a chaotic signal by the corresponding k^{th}-chaotic signal generator.

9. A method as claimed in Claim 8, wherein the chaotic signal includes a series of numbers generated by the chaotic algorithm within the bit period.

10. A method as claimed in Claim 9, wherein the chaotic signal is generated by the steps of:

a) inputting a random number to the chaotic algorithm to generate a first chaotic number;

b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and

c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated.

11. A method as claimed in Claim 8, wherein M equals to 2, and each digit has a value of either 0 or 1.

12. A method as claimed in Claim 11, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.

13. A method for receiving the value k in a system for transmitting and receiving a digital message having N digits, each of said N digits having any one of M values, and wherein each of said M values k corresponds with a k^{th}-chaotic signal generator having chaotic characteristic value associating with a chaotic algorithm to generate a chaotic signal, said chaotic signal being transmitted within a bit period comprising a series of number generated by the step of:

a) inputting a random number to the chaotic algorithm to generate a first chaotic number;

b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and

c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated,

including the step of receiving the chaotic signal at a receiver storing the chaotic characteristic values of all of the chaotic signal generators and a demodulating algorithm, and demodulating the chaotic signal to generate the transmitted value k.

14. A method as claimed in Claim 13, wherein the chaotic signal is demodulated by the demodulating algorithm by the steps of:

- evaluating the chaotic value of the chaotic signal
- matching the evaluated chaotic value with the stored chaotic characteristic values; and
- assigning the transmitted value according to the closest match between the evaluated chaotic value and the stored chaotic characteristic values.

15. A method as claimed in Claim 14, wherein the evaluated chaotic value and the stored chaotic characteristic values are matched by the steps of:

d) pairing the first two numbers of the chaotic signal received by the receiver to form a first plot on a two-dimensional plane;

e) repeating step d) for all two consecutive numbers subsequently received by the receiver within the bit period to generate a return map;

f) evaluating the chaotic value of the return map; and

g) matching the chaotic value with the stored chaotic values.

16. A method as claimed in Claim 13, wherein M equals to 2, and each digit has a value of either 0 or 1.

17. A method as claimed in Claim 16, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.

18. A system for transmitting and receiving a digital message having N digits, each of said N digits having any one of M values, and wherein each of said M values k is transmitted within a bit period, said system including:

- a transmitter having M chaotic signal generators, each of said M chaotic signal generators corresponding to one of the M values k and having a chaotic characteristic value associating with a chaotic algorithm, such that a chaotic signal is generated by a corresponding k^{th}-chaotic signal generator when a value k is transmitted; and
- a receiver having a demodulator and storing the chaotic characteristic values of all of the chaotic signal generators, to receive and demodulate the chaotic signal to generate the transmitted value.

19. A system as claimed in Claim 18, wherein the demodulator incorporates a demodulating algorithm to demodulate the chaotic signal by the steps of:

- evaluating the chaotic value of the chaotic signal
- matching the evaluated chaotic value with the stored chaotic characteristic values; and
- assigning the transmitted value according to the closest match between the evaluated chaotic value and the stored chaotic characteristic values.

20. A system as claimed in Claim 19, wherein the chaotic signal includes a series of numbers generated by the chaotic algorithm within the bit period.

21. A system as claimed in Claim 20, wherein the chaotic signal generator generates the chaotic signal by the steps of:

a) inputting a random number to the chaotic algorithm to generate a first chaotic number;
b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and
c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated.

22. A system as claimed in Claim 21, wherein the demodulator matches the evaluated chaotic value with the stored chaotic characteristic values by the steps of:

d) pairing the first two numbers of the chaotic signal received by the receiver to form a first plot on a two-dimensional plane;

e) repeating step d) for all two consecutive numbers subsequently received by the receiver within the bit period to generate a return map;

f) evaluating the chaotic value of the return map; and

g) matching the chaotic value with the stored chaotic values.

23. A system as claimed in Claim 18, wherein M equals to 2, and each digit has a value of either 0 or 1.

24. A system as claimed in Claim 23, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.

25. A transmitter for use in a system for transmitting and receiving a digital message having N digits, each of said N digits having any one of M values, and wherein each of said M values k is transmitted within a bit period, said transmitter having M chaotic signal generators, each of said M chaotic signal generators correspond to one of the M values k and having a chaotic characteristic value associating with a chaotic algorithm, such that a chaotic signal is generated by a corresponding k^{th}-chaotic signal generator when a value k is transmitted.

26. A transmitter as claimed in Claim 25, wherein the chaotic signal includes a series of numbers generated by the chaotic algorithm within the bit period.

27. A transmitter as claimed in Claim 26, wherein the chaotic signal generator generates the chaotic signal by the steps of:

a) inputting a random number to the chaotic algorithm to generate a first chaotic number;

b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and

c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated.

28. A transmitter as claimed in Claim 25, wherein M equals to 2, and each digit has a value of either 0 or 1.

29. A transmitter as claimed in Claim 28, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.

30. A receiver for use in a system for transmitting and receiving a digital message having N digits, each of said N digits having any one of M values, and wherein each of said M values k corresponds with a k^{th}-chaotic signal generator having chaotic characteristic value associating with a chaotic algorithm to generate a chaotic signal, said chaotic signal being transmitted within a bit period comprising a series of number generated by the step of:

a) inputting a random number to the chaotic algorithm to generate a first chaotic number;

b) inputting the first chaotic number to the chaotic algorithm to generate a second chaotic number; and

c) repeating step b) using the second chaotic number as the first chaotic number until all numbers to be transmitted within the bit period are generated,

wherein said receiver has a demodulator and stores the chaotic characteristic values of all of the chaotic signal generators, to receive and demodulate the chaotic signal to generate the transmitted value.

31. A receiver as claimed in Claim 30, wherein the demodulator incorporates a demodulating algorithm to demodulate the chaotic signal by the steps of:

- evaluating the chaotic value of the chaotic signal
- matching the evaluated chaotic value with the stored chaotic characteristic values; and
- assigning the transmitted value according to the closest match between the evaluated chaotic value and the stored chaotic characteristic values.

32. A receiver as claimed in Claim 31, wherein the demodulator matches the evaluated chaotic value with the stored chaotic characteristic values by the demodulating algorithm by the steps of:

d) pairing the first two numbers of the chaotic signal received by the receiver to form a first plot on a two-dimensional plane;
e) repeating step d) for all two consecutive numbers subsequently received by the receiver within the bit period to generate a return map;
f) evaluating the chaotic value of the return map; and
g) matching the chaotic value with the stored chaotic values.

33. A receiver as claimed in Claim 30, wherein M equals to 2, and each digit has a value of either 0 or 1.

34. A receiver as claimed in Claim 33, wherein the chaotic algorithm is $y = m[0.5 - 2|x|]$, x is an input number, m is the chaotic characteristic value, and y is one of the numbers forming the chaotic signal.